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Professor D. Kleppner

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Work by Prof. Kleppner and his collaborators is summarized here.

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Final report, AFOSR 89-0188

Daniel Kleppner
Massachusetts Institute of Technology

This grant is for instrumentation of a laser system for use in developing a new type of atomic trap, an atomic hydrogen trap that operates in the microkelvin regime. The laser system is designed to provide radiation at 243 nm in order to drive the $1S \rightarrow 2S$ two-photon transition in atomic hydrogen. The system is based on a Coherent Model 699-21 Dye Laser, that is driven by a Model 200-K3 krypton ion laser. This generates 486 nm radiation which is frequency doubled in an external ring cavity.

The system has been assembled and successfully operated. It delivers 5 mW of 243 nm radiation, which is, to our knowledge, a new record. The laser has been stabilized against a cavity with a spectral noise of less than 2 kHz.

We are pleased that the system is operating so well, for it represents state of the art in coherent UV generation. It is currently being integrated with a new atomic trap which has been designed to allow optical access to the sample. We hope to bring the new system into operation over the summer.

The laser system purchased under this grant is a vital component of our program to study hydrogen at ultra low temperatures, and also to carry forward laser spectroscopy to new regimes of precision. Operation of the system, already stimulated the development of our over all research plans, and we expect the system to be productive for many years to come.

Daniel Kleppner
May 30, '90